

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
19 September 2002 (19.09.2002)

PCT

(10) International Publication Number
WO 02/074006 A2

(51) International Patent Classification⁷: **H04R 1/00**

(21) International Application Number: PCT/GB02/01109

(22) International Filing Date: 11 March 2002 (11.03.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0105980.7 10 March 2001 (10.03.2001) GB

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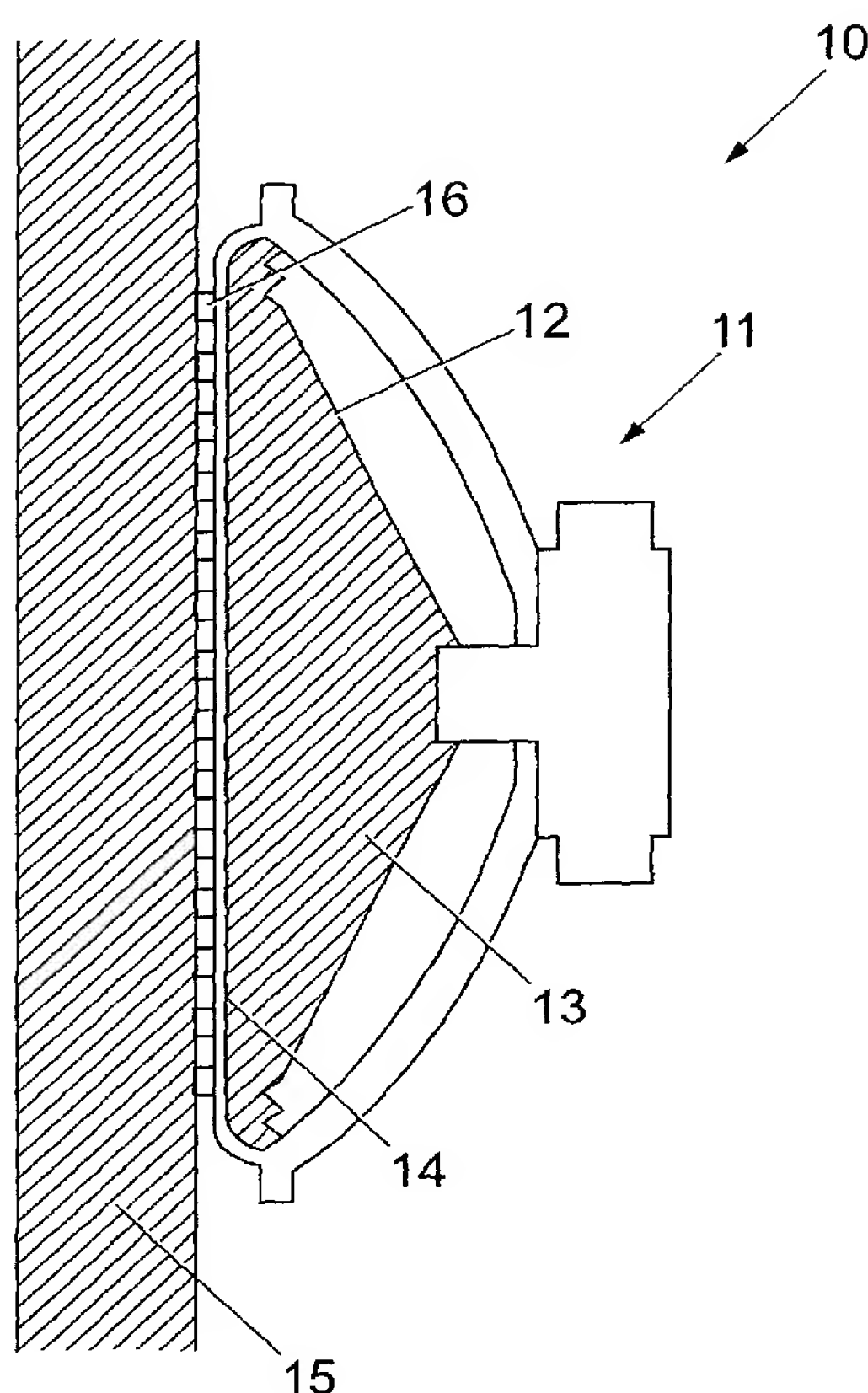
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(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),

[Continued on next page]

(54) Title: **SPEAKER ARRANGEMENT**



(57) Abstract: There is described a speaker arrangement (10) which comprises a sound emitting element which is formed of a standard loudspeaker (11) having a cone (12). The cone (12) is filled with a filling material (13) which is inserted into the interior of the cone (12). The loudspeaker (11) can be attached to the rear of a display panel (15) if desired. The loudspeaker (11) is driven by an amplifier which is integrated into circuitry, the circuitry also including an audio input (such as an MP3 player), volume control and a power source. The circuitry can also incorporate further input signals such as signals from activation sensors and signals from a communication device used to update the audio data utilised by the MP3 player. There is also described a method of providing display panels, the display panels incorporating an audio player and speaker, the method comprising the steps of supplying and distributing display panels incorporating a speaker, designing and producing panel graphics to be displayed on the display panels, producing and directing audio messages, producing and distributing of the audio messages to a consumer, and updating and replacing the art work on the graphic panels when necessary.

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European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

- *without international search report and to be republished upon receipt of that report*

1 **Speaker Arrangement**

2

3 The present invention relates to a speaker
4 arrangement used particularly, but not exclusively,
5 to increase the performance of low cost loudspeakers
6 in concealed or secure applications (such as behind
7 advertising display panels), where a conventional
8 speaker grill cannot be used.

9

10 Conventional speaker arrangements for use in such
11 concealed applications (such as behind advertising
12 display panels), must be permanently fixed to the
13 rear surface of the display panel in order to
14 transmit the sound effectively. If not securely
15 fixed, poor sound quality results.

16

17 According to the present invention there is provided
18 a speaker arrangement comprising a sound emitting
19 element, a filling material engaging the sound
20 emitting element and defining a first generally
21 planar surface adapted to abut a second generally
22 planar surface such that sound is transmitted from

1 the sound emitting element through the filling
2 material to the second planar surface.

3

4 Preferably, the filling material is inserted into
5 the interior of the sound emitting element.

6

7 Preferably, the sound emitting element is in the
8 form of a cone.

9

10 Preferably, the first planar surface is at the base
11 of the cone.

12

13 Preferably, the second planar surface resonates to
14 produce sound.

15

16 Preferably the filling material is formed of one of
17 the following materials:

18 Liquids such as water and water based solutions,
19 alcohol (e.g. methanol, ethanol), metals (such as
20 mercury), glycerinates, oils (synthetic, mineral or
21 vegetable);

22 gels such as gelatines, petroleum, silicon,
23 polymeric gels;

24 greases such as silicon, graphite, petroleum;

25 elastomers such as silicon rubber, natural

26 rubber/latex, PVC, acrylate cross polymers;

27 solids (powders) such as graphite, iron, talcum.

28

29 Preferably, an intermediate layer is provided
30 between the first planar surface and the second
31 planar surface, said intermediate layer acting to
32 hold the cone against the second planar surface.

1

2 Preferably the intermediate layer is formed of
3 silicon grease.

4

5 Preferably, the filling material is retained within
6 the cone by a membrane which is conjoined to the
7 base of the cone.

8

9 Preferably the membrane is formed of one of the
10 following materials:
11 polypropylene, PVC, styrene, PTFE, rubber (natural
12 or silicon) or cellulose.

13

14 Embodiments of the present invention will now be
15 described by way of example only, with reference to
16 the accompanying drawings, where:

17

18 Fig. 1 is an exploded schematic perspective
19 view of part of the speaker arrangement of the
20 present invention, viewed from below;

21

22 Fig. 2 is an exploded schematic perspective
23 view of part of the speaker arrangement of Fig.
24 1, viewed from above;

25

26 Fig. 3 is a schematic perspective view of part
27 of the speaker arrangement of the present
28 invention, viewed from above; and

29

30 Fig. 4 is a schematic cross sectional diagram
31 of one embodiment the speaker arrangement of
32 the present invention.

1

2 Referring to the drawings, there is illustrated a
3 speaker arrangement 10 which comprises a sound
4 emitting element which is formed of a standard
5 loudspeaker 11 having a cone 12. The cone 12 is
6 filled with a filling material 13 which is inserted
7 into the interior of the cone 12.

8

9 The filling material 13 fills the interior of the
10 cone 12 and defines a first planar surface at the
11 base of the cone 12.

12

13 The filling material 13 is retained in place by a
14 membrane 14 which is joined to the base end of the
15 cone 12.

16

17 The first planar surface abuts against a second
18 planar surface (such as the rear side of a graphic
19 display panel 15) by way of an intermediate layer 16
20 which is provided between the first planar surface
21 and the second planar surface. The intermediate
22 layer 16 acts to removeably attach the loudspeaker
23 11 (with the filling material 13 inserted) to the
24 rear of the display panel 15. The loudspeaker 11
25 may also be permanently attached to the rear of the
26 display panel 15 if desired. The speaker
27 arrangement 10 can also operate with no membrane 14
28 and/or no intermediate layer 16.

29

30 The first planar surface of the filling material 13
31 can protrude slightly from the base of the cone 12
32 to define an expansion gap around the perimeter of

1 the base of the cone 12, between the base of the
2 cone 12 and the second planar surface.

3

4 The invention has broad applications and alternative
5 uses are envisaged for the loudspeaker 11 having the
6 filling material 13 inserted, for example, instead
7 of being used at the rear of a display panel 15, the
8 loudspeaker 11 could be attached to the rear of wall
9 panels, plasterboard, glass, wood, tiles or any
10 other surface. The loudspeaker 11 with fill
11 material 13 inserted is particularly useful in
12 concealed location where it is preferable that no
13 hole is cut in the mounting surface to hold the
14 speaker and where it is desirable not to have a
15 visible speaker grill, such as for cases where
16 aesthetic or security considerations must be taken
17 into account.

18

19 There are many envisaged materials which could be
20 used in the forming of the speaker arrangement 11,
21 some of these are listed below:

22

23 The filling material 13 may be formed of one of the
24 following materials:

25 Liquids such as water and water based solutions,
26 alcohol (e.g. methanol, ethanol), metals (such as
27 mercury), glycerinates, oils (synthetic, mineral or
28 vegetable);

29 gels such as gelatines, petroleum, silicon,
30 polymeric gels;

31 greases such as silicon, graphite, petroleum;

1 elastomers such as silicon rubber, natural
2 rubber/latex, PVC, acrylate cross polymers;
3 solids (powders) such as graphite, iron, talcum.

4
5 Alternatively, it is also envisaged that pressurised
6 gas could be utilised as the filling material 13,
7 the membrane 14 acting to contain the pressurised
8 gas within the cone 12.

9
10 The intermediate layer 16 may be formed of silicon
11 grease.

12
13 The membrane 14 may be formed of one of the
14 following materials:

15 polypropylene, PVC, styrene, PTFE, rubber (natural
16 or silicon) or cellulose.

17
18 The cone 12 may be formed of one of the following
19 materials:

20 Polypropylene, Mylar, Kevlar, Carbon Fibre,
21 Aluminium, Polycarbonate, Styrene or paper.

22
23 The loudspeaker 11 is driven by an amplifier (not
24 shown) which is integrated into circuitry, the
25 circuitry also including an audio input (such as an
26 MP3 player), volume control and a power source. The
27 circuitry can also incorporate further input signals
28 such as signals from activation sensors and signals
29 from a communication device used to update the audio
30 data utilised by the MP3 player.

31

1 In use in the specific application of the graphic
2 display panel, the speaker arrangement 10 is
3 connected to the rear of the display panel 15. The
4 loudspeaker 11 is connected to the amplifier
5 (incorporated into the circuitry). Optional sensors
6 can also be connected to the circuitry to provide an
7 interactive element to the display panel 15. For
8 example, the sensors may activate the audio input
9 when they detect the motion of a person passing the
10 display panel 15, detect the touch of a specific
11 area of the display panel or may be set to activate
12 the audio input on a time dependent loop.

13

14 The MP3 player on the circuitry is loaded with audio
15 data, such as an advertising trailer. Multiple
16 advertising trailers can be stored for use and
17 different advertising trailers may be loaded to
18 activate corresponding to specific sensors which are
19 activated.

20

21 When activated, the MP3 player and the amplifier are
22 adapted, by way of circuitry, to send a signal to
23 the loudspeaker 11 which drives the loudspeaker 11
24 to emit a sound. This sound passes through the
25 filling material 13, the membrane 14 and the
26 intermediate layer 16 and is transmitted to the
27 display panel 15, which resonates to produce sound.

28

29 It has been found that the sound quality of the
30 sound emitted from the resonating display panel 15
31 when using the loudspeaker 11 filled with the
32 filling material 13 is greatly enhanced over the use

1 of a speaker having no filling material 13, both the
2 bass and the mid range responses are enhanced.

3

4 The MP3 audio input used may be substituted for any
5 other suitable form of audio input such as, for
6 example, compact disc, mini-disc or microphone.

7

8 Modifications and improvements may be made to the
9 foregoing without departing from the scope of the
10 present invention.

11

12 The speaker arrangement of the invention can be
13 advantageously used in a method of providing display
14 panels. Accordingly there is also provided a method
15 of providing display panels, the display panels
16 incorporating an audio player and speaker, the
17 method comprising the steps of supplying and
18 distributing display panels incorporating a speaker,
19 designing and producing panel graphics to be
20 displayed on the display panels, producing and
21 directing audio messages, producing and distributing
22 of the audio messages to a consumer, and updating
23 and replacing the art work on the graphic panels
24 when necessary.

25

26 Preferably, the audio messages are in MP3 format and
27 can be updated and/or distributed via the Internet,
28 Intranet, by modem link or by mobile telephone
29 connection or any other communication link.

30

31 The method of providing display panels as
32 illustrated in Fig.5. is a turnkey system where all

1 the customers needs in obtaining and maintaining
2 display panels are catered for.

3

4 The method comprises the steps of the supply and
5 distribution of speaker display panels (such as
6 those described above), the origination and
7 production of panel graphics, the production and
8 direction of audio messages, the production and
9 distribution of audio message updates and
10 distribution of these updates via a communication
11 device such as the internet, and the updating and
12 replacement of the artwork on the display panels.

13

14 Modifications and improvements may be made to the
15 foregoing without departing from the scope of the
16 present invention.

1 Claims

2

3 1. A speaker arrangement comprising a sound
4 emitting element, a filling material engaging the
5 sound emitting element and defining a first
6 generally planar surface adapted to abut a second
7 generally planar surface such that sound is
8 transmitted from the sound emitting element through
9 the filling material to the second planar surface.

10

11 2. A speaker arrangement as claimed in Claim 1,
12 wherein the filling material is inserted into the
13 interior of the sound emitting element.

14

15 3. A speaker arrangement as claimed in Claim 1 or
16 Claim 2, wherein the sound emitting element is in
17 the form of a cone.

18

19 4. A speaker arrangement as claimed in Claim 3,
20 wherein the first planar surface is at the base of
21 the cone.

22

23 5. A speaker arrangement as claimed in any
24 preceding claim, wherein the second planar surface
25 resonates to produce sound.

26

27 6. A speaker arrangement as claimed in any
28 preceding claim, wherein the filling material is
29 selected from one of the following materials:
30 liquids; gels; alcohols; metals; oils; greases;
31 elastomers; solids; powders.

32

1 7. A speaker arrangement as claimed in any
2 preceding claim, wherein the filling material is
3 selected from one of the following materials:
4 water; water based solutions; methanol; ethanol;
5 mercury; glycerinates; synthetic oils, mineral oils
6 or vegetable oils; gelatines; petroleum gel; silicon
7 gel; polymeric gels; silicon grease; graphite
8 grease; petroleum grease; silicon rubber; natural
9 rubber/latex; PVC; acrylate cross polymers;
10 graphite solids; iron solids; talcum.

11

12 8. A speaker arrangement as claimed in any
13 preceding claim, wherein an intermediate layer is
14 provided between the first planar surface and the
15 second planar surface.

16

17 9. A speaker arrangement as claimed in Claim 8,
18 wherein the intermediate layer is formed of silicon
19 grease.

20

21 10. A speaker arrangement as claimed in any of
22 Claims 3 to 9 when dependent upon Claim 3, wherein
23 the filling material is retained within the sound
24 emitting element by a membrane.

25

26 11. A speaker arrangement as claimed in Claim 10,
27 wherein the membrane is formed of one of the
28 following materials:

29 polypropylene, PVC, styrene, PTFE, rubber (natural
30 or silicon) or cellulose.

31

1 12. A method of providing display panels, the
2 display panels incorporating an audio player and
3 speaker, the method comprising the steps of
4 supplying and distributing display panels
5 incorporating a speaker, designing and producing
6 panel graphics to be displayed on the display
7 panels, producing and directing audio messages,
8 producing and distributing of the audio messages to
9 a consumer, and updating and replacing the art work
10 on the graphic panels when necessary.

11

12 13. A method as claimed in Claim 11, wherein the
13 audio messages are in MP3 format and can be updated
14 or distributed via a communication link.

15

16 14. A method as claimed in Claim 11 or Claim 12
17 comprising the steps of the supply and distribution
18 of speaker display panels, the origination and
19 production of panel graphics, the production and
20 direction of audio messages, the production and
21 distribution of audio message updates and
22 distribution of these updates via a communication
23 device such as the internet, and the updating and
24 replacement of the artwork on the display panels.

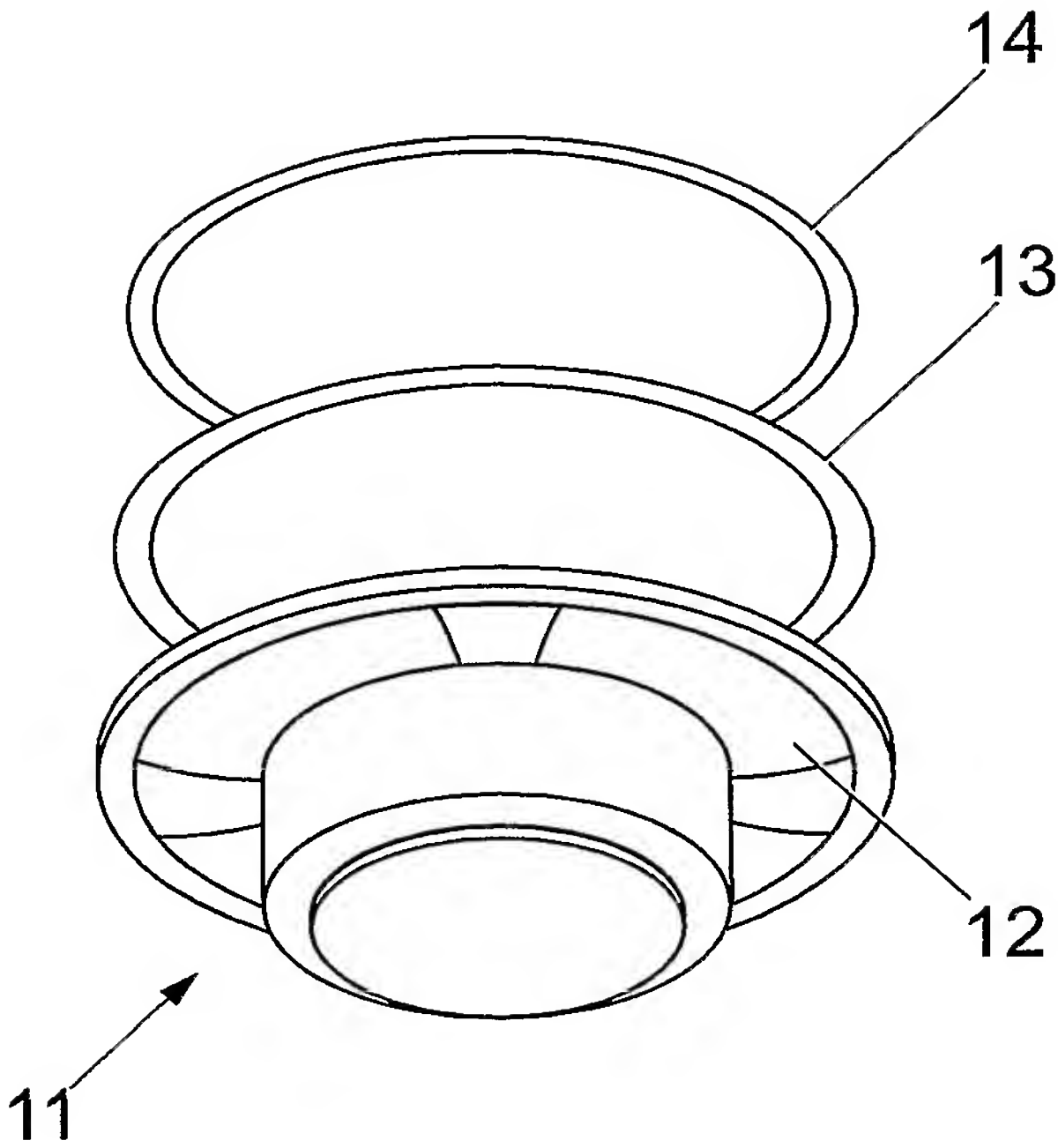


Fig. 1

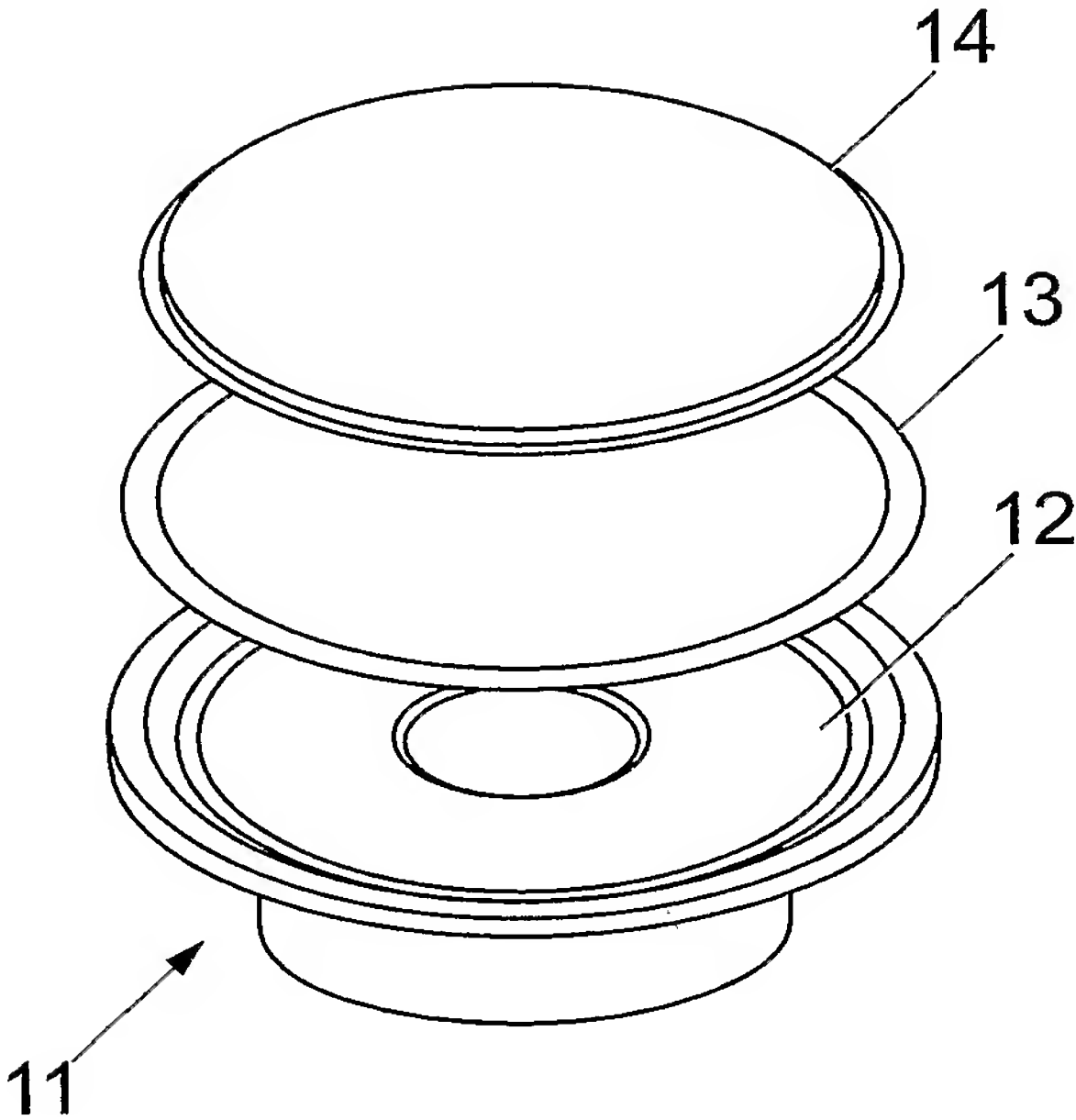


Fig. 2

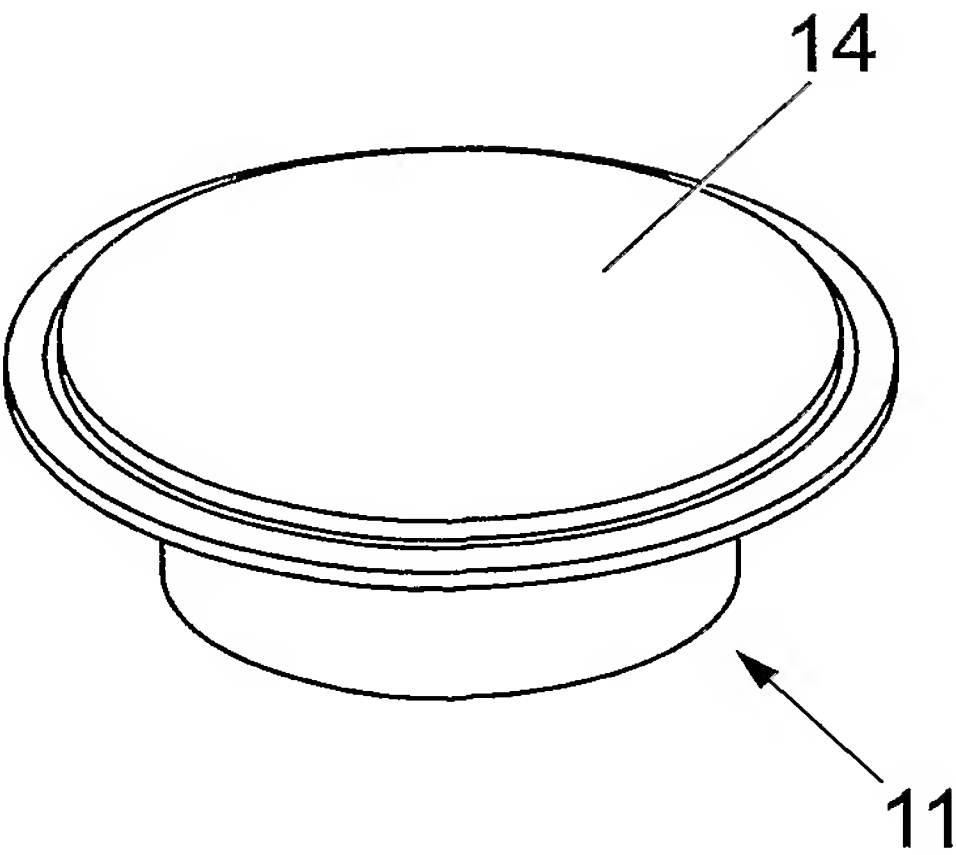


Fig. 3

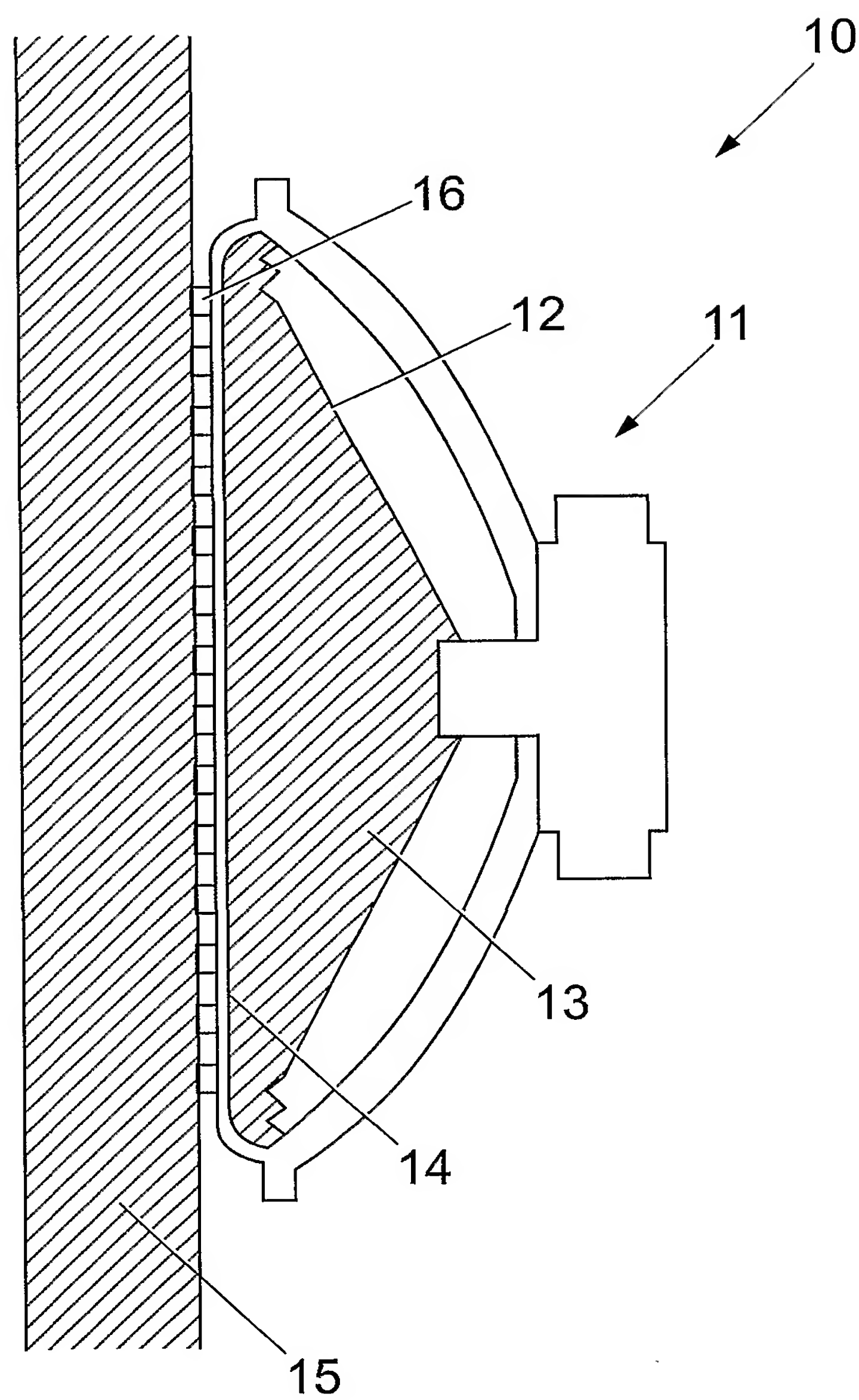


Fig. 4

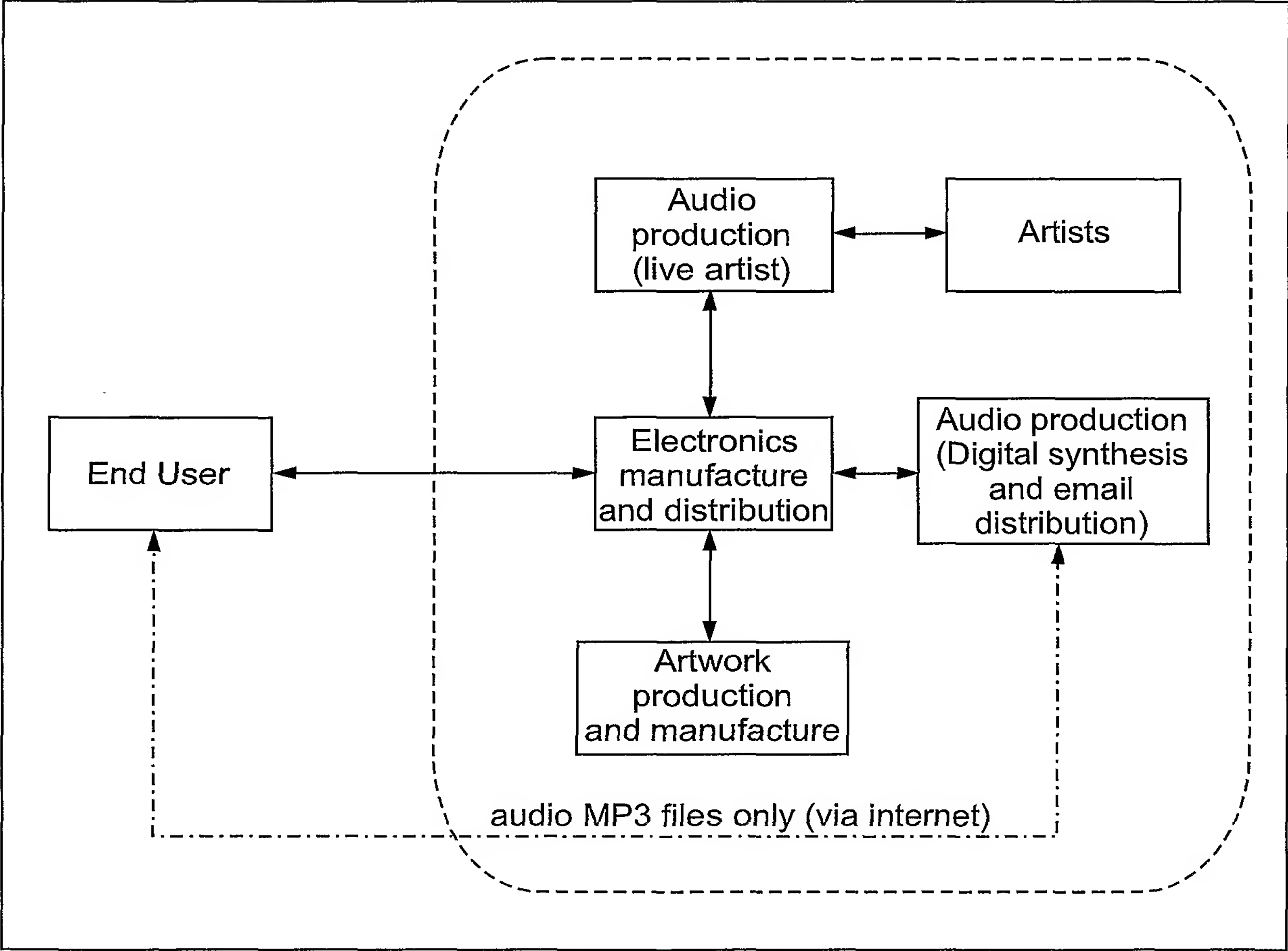


Fig. 5